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Acupuncture for cancer pain in adults (Review)

Paley CA, Johnson MI, Tashani OA, Bagnall AM



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Acupuncture for cancer pain in adults

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ABSTRACT

Background

Forty percent of individuals with early or intermediate stage cancer and 90% with advanced cancer have moderate to severe pain and up to 70% of patients with cancer pain do not receive adequate pain relief. It has been claimed that acupuncture has a role in management of cancer pain and guidelines exist for treatment of cancer pain with acupuncture.

Objectives

To evaluate efficacy of acupuncture for relief of cancer-related pain in adults.

Search methods

CENTRAL, MEDLINE, EMBASE, PsycINFO, AMED, and SPORTDiscus were searched up to November 2010 including non-English language papers.

Selection criteria

Randomised controlled trials (RCTs) evaluating any type of invasive acupuncture for pain directly related to cancer in adults of 18 years or over.

Data collection and analysis

It was planned to pool data to provide an overall measure of effect and to calculate the number needed to treat to benefit, but this was not possible due to heterogeneity. Two review authors (CP, OT) independently extracted data adding it to data extraction sheets. Quality scores were given to studies. Data sheets were compared and discussed with a third review author (MJ) who acted as arbiter. Data analysis was conducted by CP, OT and MJ.

Main results

Three RCTs (204 participants) were included. One high quality study investigated the effect of auricular acupuncture compared with auricular acupuncture at 'placebo' points and with non-invasive vaccaria ear seeds attached at 'placebo' points. Participants in two acupuncture groups were blinded but blinding wasn't possible in the ear seeds group because seeds were attached using tape. This may have biased results in favour of acupuncture groups. Participants in the real acupuncture group had lower pain scores at two month follow-up than either the placebo or ear seeds group.

There was high risk of bias in two studies because of low methodological quality. One study comparing acupuncture with medication concluded that both methods were effective in controlling pain, although acupuncture was the most effective. The second study compared acupuncture, point-injection and medication in participants with stomach cancer. Long-term pain relief was reported for both acupuncture and point-injection compared with medication during the last 10 days of treatment. Although both studies have positive results in favour of acupuncture they should be viewed with caution due to methodological limitations, small sample sizes, poor reporting and inadequate analysis.

Authors' conclusions

There is insufficient evidence to judge whether acupuncture is effective in treating cancer pain in adults.

PLAIN LANGUAGE SUMMARY

Acupuncture for cancer-related pain in adults

Up to 70% of patients with cancer-related pain do not receive adequate pain relief and this reduces their quality of life. Acupuncture may have a role to play in relieving cancer-related pain. This review evaluated evidence for the effectiveness of acupuncture in reducing pain associated with cancer or its treatment, or both. We found three studies (looking at a total of 204 participants) which met our inclusion criteria, but all had small sample sizes, leaving them prone to bias, and only one study was judged to be of high methodological quality. The high quality study found that auricular (ear) acupuncture reduced cancer-related pain when compared with auricular acupuncture at non acupuncture points, but the control group was not adequately blinded and this was likely to affect the outcomes. Of the low quality studies, one found that acupuncture was as effective as medication, and one study found that acupuncture was more effective than medication, but both studies were poorly designed and the study reports lacked detail. We concluded that there was insufficient evidence to judge whether acupuncture is effective in relieving cancer-related pain in adults.

BACKGROUND

Description of the condition

Cancer-related pain represents a major challenge in healthcare. Forty percent of individuals with early or intermediate stage cancer and 90% of individuals with advanced cancer have moderate to severe pain ([Laird 2008](#); [Payne 1998](#)). Pain in cancer patients may be due to pre-existing pathologies, progression of the disease, tumour growth, bone metastases (cancer-induced bone pain, CIBP) or the treatment of cancer itself ([Strong 2002](#); [Twycross 2008](#); [Urch 2008](#)). Bone pain due to metastatic cancer is often particularly severe, unremitting and poorly controlled with patients often having to take high doses of drugs with undesirable side-effects ([Gralow 2007](#)). Up to 70% of patients with cancer-related pain do not receive adequate pain relief and this affects physical and psychological well-being, leading to a lower quality of life for the patient ([Keskinbora 2007](#); [Vallerand 2007](#); [van den Beuken-van Everdingen 2007a](#); [van den Beuken-van Everdingen 2007b](#)).

Description of the intervention

Acupuncture is a treatment intervention delivered by practitioners aligned to different philosophical paradigms ([MacPherson 2007](#)). Acupuncture is used throughout the world to manage non-malignant acute and chronic pain. It is claimed that acupuncture has a role in the management of cancer pain ([Alimi 2003](#); [Dillon 1999](#); [Filshie 2004](#)) and guidelines exist for the acupuncture treatment of cancer pain ([Filshie 2006](#)). Anecdotal evidence suggests that it is routinely used in clinical practice by physiotherapists for a variety of pain states ([Hopwood 2004](#)) and increasingly by the medical profession for pain relief in general ([MacPherson 2007](#)). [Filshie 1990](#) described the use of acupuncture for malignant pain on 193 cancer patients over a five year period and reported that 56% of patients had a 'worthwhile' improvement for seven days or more and 22% had an improvement for a 'limited duration'. A further 22% obtained no benefit at all.

There continues to be a debate about the efficacy of acupuncture ([Ernst 2006](#)). Some systematic reviews and meta-analyses report that acupuncture is superior to placebo or sham acupuncture for osteoarthritis of the knee ([Bjordal 2007](#); [White 2007](#)), peripheral joint osteoarthritis ([Kwon 2006](#)), post-operative pain ([Sun 2008](#)),

neck and shoulder pain (He 2004; Trinh 2006) and chronic low back pain (Furlan 2005; Manheimer 2005). However, other review authors have found limited efficacy for osteoarthritis of the knee (Manheimer 2007), tension-type headache (Davis 2008) and inconclusive evidence for shoulder pain (Green 2005) and chronic pain in general (Ezzo 2000). A systematic review of systematic reviews of acupuncture published between 1996 to 2005, claimed to apply more rigorous inclusion criteria than previous reviews and concluded that there was no robust evidence that acupuncture is superior to a sham acupuncture control (Derry 2006). Trials comparing both acupuncture and sham acupuncture with patients on a waiting list tended to show benefits of both acupuncture and sham over the waiting list group. Sham acupuncture can either be a non-penetrative sham (i.e. it has the appearance of real acupuncture but the needle is blunt and does not penetrate the skin) or penetrative sham (i.e. where the needle penetrates the skin but is used on non-acupuncture points). It has been suggested that the dosage of acupuncture required for a beneficial effect is a minimum of six treatments using at least four points at a frequency of at least once a week, although the evidence supporting these recommendations has not been widely researched (Ezzo 2000; White 2007). White 2007 also suggests that the needle sensation, 'de qi', or in electro-acupuncture a strong sensation of paraesthesiae must be achieved for optimum benefit.

To date, there has only been one systematic review of acupuncture for cancer pain (Lee 2005). This was not conducted using a Cochrane protocol. Seven studies met the eligibility criteria: three were RCTs and four were uncontrolled studies. Only one small RCT was identified (Alimi 2003), and the investigators concluded that auricular (ear) acupuncture provided statistically significant pain relief when compared with placebo acupuncture. It was not possible to meta-analyse the results of the review due to heterogeneity in pain states, patient populations and acupuncture protocols in the identified studies. Four studies used body acupuncture, two used auricular acupuncture and one used electro-acupuncture (where an electric current is transmitted via the needles). Control groups used were either patients receiving conventional therapies or placebo/sham acupuncture. The review authors concluded that there was insufficient good quality evidence to determine the effectiveness of acupuncture in relieving cancer pain. More recently, Bardia et al (Bardia 2006) conducted a systematic review of the effectiveness of complementary and alternative medicine therapies for cancer related pain but was unable to evaluate the efficacy of acupuncture because of insufficient good quality evidence. Bone metastases are common in advanced cancers, particularly in patients with multiple myeloma, breast, prostate or lung cancer (Brainin-Mattos 2006; Lipton 2004). The incidence of bone involvement has been said to exceed 90% in metastatic prostate and breast cancers (Rosier 1998). Bone pain due to metastatic cancer is severe, unremitting and poorly controlled (Gralow 2007; Ripamonti 2000). Mainstay treatments are opiates and bisphosphonates, although they can have severe adverse effects (Petrut

2008). Nowadays, the survival rate of many patients after diagnosis of bone metastases is relatively long; five year survival rates have been quoted at 64% for metastatic breast disease and 46% for metastatic prostate cancers (Coleman 2001). In view of this it is important to control pain and preserve function to enable these patients to enjoy as high a quality of life as possible (Qaseem 2008). Filshie 1990 claims that acupuncture is useful in 'selected' patients with CIBP, where pain is difficult to control adequately and pharmacological input is very high, resulting in unpleasant side-effects. To date, no systematic reviews on acupuncture for CIBP have been conducted and therefore the efficacy of acupuncture as a treatment for CIBP is unknown.

Why it is important to do this review

To date, there have been no Cochrane reviews on acupuncture for cancer-related pain. Clinical trials on acupuncture for cancer-related pain have been published in recent years (Chen 2008; Mao-Ying 2006; Mao-Ying 2008; Mehling 2007) so there is a need to update the systematic review conducted by Lee *et al* (Lee 2005).

The high incidence of CIBP merits a subgroup analysis, although preliminary searches have not revealed any controlled trials. It is necessary to establish whether any studies exist, the quality of the research and any important findings.

Within the review as a whole and in the subgroup analysis on CIBP, studies with heterogeneous cancer populations will not be excluded. However, heterogeneous studies will be identified and discussed as part of the review.

OBJECTIVES

To evaluate the efficacy of acupuncture for the relief of cancer-related pain in adults.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) (crossover or parallel group design) which evaluated any type of invasive acupuncture for cancer-related pain in adults were included, from inception of each database onwards. These included studies which did not blind the therapist because blinding an acupuncturist to the treatment is problematical.

Studies were excluded if they were non-randomised trials, case reports, abstracts and letters (unless additional information from published RCTs was included).

Types of participants

Male and/or female adult participants of 18 years or older were included. They had cancer-related pain (as defined by commonly used verbal rating scales or questionnaires), which was thought to be directly linked to the development of their cancer and not due to pre-existing pathologies or related to treatments; for example, chemotherapy-induced neuropathic pain (Cata 2006); or procedures such as surgery. We intended to review CIBP as our subgroup analysis if the data allowed.

Types of interventions

Studies which evaluated any type of invasive acupuncture were included. This included studies using manual acupuncture, electroacupuncture and auricular (ear) acupuncture. Both Western style and traditional Chinese acupuncture were included. Western-style acupuncture is characterised by its scientific approach, using a physiologically-based rationale for the treatment and explanation of its effects, whereas traditional Chinese acupuncture is based on the ancient principles of Chinese medicine. Studies using different forms of needle stimulation (such as electroacupuncture) and different needling techniques were also included, but studies using comparisons of non-invasive techniques such as laser acupuncture or acupressure were excluded.

Pain outcomes may be compromised in studies which allow free access to analgesic medication. It was planned to include such studies in the review and analyse them as a sub-group for differences in analgesic consumption between groups.

It was also intended that a subgroup analysis would be carried out on adequacy of acupuncture based on the following criteria (White 2007):

- number of needles: ≥ 4 acupuncture points;
- needling technique: ≥ 20 minutes per session;
- needle sensation: reported as 'de qi' or needle sensation for manual acupuncture or a 'strong sensation' for electroacupuncture;
- number of treatments: six treatments at least one per week.

The intervention to be compared with acupuncture would include any of the following:

- no treatment;
- treatment as usual;
- non-penetrative sham (i.e. non-invasive treatment);
- penetrative sham (i.e. invasive treatment at non-acupuncture points);
- other active interventions.

Types of outcome measures

Primary outcomes

The primary outcome measure was patient reported pain intensity using validated scales (e.g. visual analogue scales (VAS), numerical rating scales) or verbal reporting.

Secondary outcomes

Secondary outcome measures included any of the following:

- pain relief as measured by validated pain scales (e.g. VAS);
- patient satisfaction;
- quality of life;
- analgesic consumption and changes in concurrent treatments;
- hospital attendance/admission (including Hospice admission);
- adverse events (major or minor).

Search methods for identification of studies

Electronic searches

The following data sources were searched from the inception of each database until October 2010:

1. the Cochrane Central Register of Controlled Trials (CENTRAL);
2. MEDLINE;
3. EMBASE;
4. PsycINFO;
5. AMED;
6. SPORTDiscus.

Detailed search strategies were developed for each electronic database searched in order to identify studies suitable for inclusion in the review. These were based on the search strategy developed for MEDLINE, but were revised according to the database being used (see Appendix 1; Appendix 3; Appendix 4; Appendix 5; and Appendix 6).

The MEDLINE search was carried out with the following filter: Cochrane Highly Sensitive Search Strategy (CHSSS) for identifying randomised trials in MEDLINE via Ovid, as published in Chapter 6.4.11.1 of the Cochrane Handbook for Systematic Reviews of Interventions, version 5.0.1 (Higgins 2008).

The search strategy attempted to identify all relevant studies irrespective of language. Non-English papers were assessed for relevance and decisions on translation were taken on a case-by-case basis, as suggested in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins 2008).

Searching other resources

Reference lists of eligible studies and previous systematic reviews were also reviewed to identify further eligible studies.

Data collection and analysis

The study selection process is shown in Figure 1.

Selection of studies

Two review authors (CP and OT) with a third review author (MJ) acting as arbiter independently selected the studies to be considered in the review following the literature searches described in the previous section.

Data extraction and management

Data extraction was conducted up to and including October 2010. A search log was completed, showing databases searched and the dates of searches. A data extraction sheet was completed for every study included in the review. Information recorded included details of authors, participants, study design, characteristics of intervention (acupuncture style, type of needle, number of needles, needling technique, needle sensation and number of treatments) and comparator, any adverse effects and baseline/end of study outcomes.

Assessment of risk of bias in included studies

A modified version of the validated Oxford five-point Quality Scale (Jadad 1996; White 1999) was used to assess quality because the original Jadad scale incorporates blinding of the acupuncturist, which is virtually impossible. Two review authors completed the data extraction and scored each study (CP and OT) with a third review author (MJ) acting as arbiter where differences occurred between the two review authors. The scores were used to assess overall quality. The maximum score was five. Studies scoring three or more points were considered as high quality. The points achieved for each of the studies were listed in a table and were used in the assessment of risk of bias Table 1.

Methodological quality was independently assessed using the Cochrane Collaboration's tool for assessing risk of bias in RCTs (Higgins 2008). Risk of bias was summarised and differences in author interpretation of data was settled through discussion.

Measures of treatment effect

It was planned that data from the outcomes of each study would be pooled to provide an overall measure of the effect of acupuncture on cancer-related pain, except where different cut-off points were used (see below). For continuous data, it was intended that results

would be presented as weighted mean differences (WMD). However, if different pain scales were used in the acupuncture studies it was planned that this data would be presented using standardised mean differences (SMD) where appropriate. Where dichotomous data existed, relative risk (RR) would be used.

Unit of analysis issues

The problem of dividing categorical data into dichotomous outcomes provides a potential source of bias as study authors might use different cut-off points for the data in each group. It was planned that outcomes from data with different cut-off points or data from clinically heterogeneous studies would not be pooled as described above. Data would be combined for all treatment periods.

Dealing with missing data

It was planned that studies with missing data would be described in the text and illustrated using tables as appropriate. To avoid bias arising from missing data, an intention-to-treat analysis (ITT) would be performed where data was continuous, using the last observation on each participant carried forward until the study endpoint. Where missing dichotomous data was identified it was planned that these would be assigned positive and negative outcomes in equal proportions. If the number of missing values was significant it was decided that it might be necessary to perform a sensitivity analysis to estimate the effect of the ITT analysis on the overall outcome. It was planned that this would be carried out by assuming a positive outcome for all missing data, followed by a negative outcome for the missing data and then assuming that the outcome would lie near the midpoint between the two values. It was decided that studies with a high attrition rate (50% or more) would not be excluded from the review because it was expected that there would be very few studies meeting the inclusion criteria.

Assessment of heterogeneity

It was planned that a Chi squared test would be used to estimate heterogeneity of both the SMD and relative risk (RR). Further analysis could be performed using the I^2 test. If possible, a forest plot would also be constructed for analysis. Where heterogeneity was statistically significant, it was planned that a random-effects model would be used to interpret the results. If heterogeneity was not statistically significant, a fixed-effect model would be used. Potential sources of heterogeneity exist in the outcomes used (e.g. differences in methods of reporting pain), population (differences in cancer site and nature, or cause of pain, age, gender, etc.), comparators used (e.g. sham/placebo, waiting list) and study design. It was planned that all studies identified for the review would be analysed to identify possible sources of heterogeneity and discussed in the text of the review.

Assessment of reporting biases

If the review authors did not find a large number of studies it was decided that publication or inclusion bias would not be assessed. However, if enough studies were available and a meaningful assessment of publication bias could be carried out, it was planned that a funnel plot would be constructed.

Data synthesis

If the data could be combined into a meta-analysis, categorical data would only be included where it could be divided into dichotomous outcomes. If the data could not be combined in a meta-analysis it was decided that this would be summarised in the text and grouped by outcome as appropriate. All data would be entered using RevMan 5 analysis software.

Subgroup analysis and investigation of heterogeneity

Where the data allowed, we planned to separate the outcome analyses and perform a subgroup analysis on outcomes of studies using acupuncture specifically for CIBP.

Sensitivity analysis

It was planned that other sources of heterogeneity would be explored using sensitivity analysis to determine the effects of the method of acupuncture treatment, overall methodological quality and use of ITT analysis. If there were any studies with high attrition rates (over 50%) they were to be removed from the meta-analysis to determine whether the results would be significantly different without them.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

See the '[Characteristics of included studies](#)' and '[Characteristics of excluded studies](#)' tables.

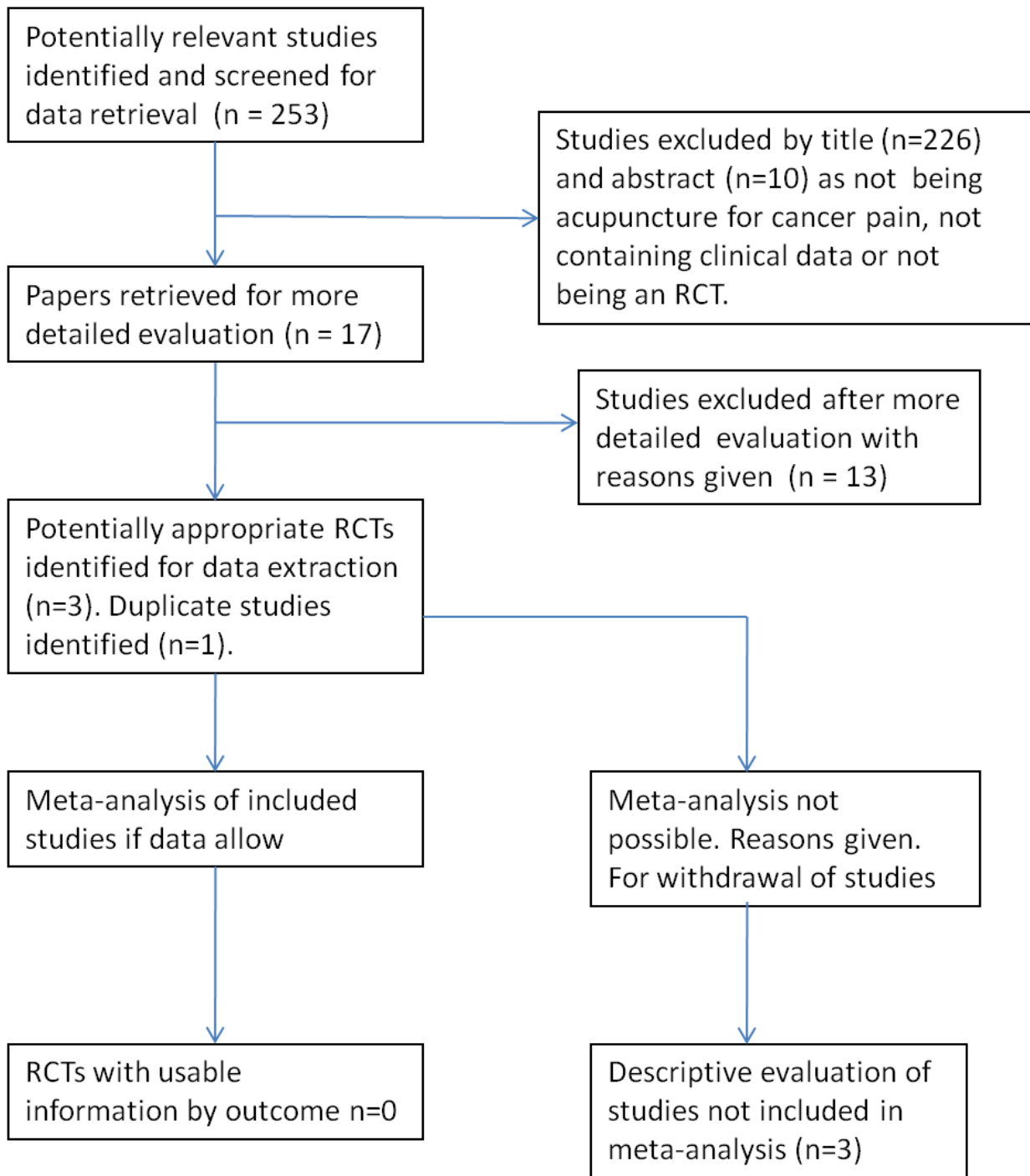
Results of the search

For inclusion in the review, studies had to meet all of the three main eligibility criteria which were:

- Investigations of acupuncture for cancer pain;
- Studies containing clinical data;
- Randomised controlled trials (RCTs).

Case reports, abstracts and letters were excluded. Where abstracts for RCTs were identified the full reports were sought and included if available. A flowchart showing the selection process is shown in [Figure 1](#). In total, 253 references were identified from the literature search of which it was possible to exclude 226 from the title alone as not meeting our eligibility criteria. Abstracts were obtained for the remaining 27 studies and a further 10 were excluded because they were not acupuncture studies, were not studies on cancer pain or they were either systematic reviews or not RCTs. Three studies could not be excluded at this stage because they required translating from French ([Nguyen 2005](#)), German ([Meng 2002](#)) and Chinese ([Chen 2008](#)). Full study reports were obtained for the remaining 17 studies and a further 13 were subsequently excluded because further examination revealed that they were post-operative studies, did not have pain as a main outcome measure or translation revealed that they did not meet the eligibility criteria of being a RCT. Three studies were included in the final review ([Alimi 2003](#); [Chen 2008](#); [Dang 1998](#)) and one study ([Dang 1997](#)) was added as a secondary reference to [Dang 1998](#).

Figure 1. Systematic Review Process Flowchart



Included studies

Three studies (looking at a total of 204 participants) met our criteria for inclusion, please see the 'Characteristics of included studies' table. An additional study was identified (Dang 1997) but because it contained data duplicated in a later report it was included as a secondary reference for an included study (Dang 1998).

Alimi 2003 randomly assigned 90 participants with chronic peripheral or central neuropathic pain related to cancer to one of the three groups:

- Auricular acupuncture using semi-permanent needles;
- Auricular acupuncture using semi-permanent needles administered at non-acupuncture (placebo) points;
- Non-invasive auricular 'seeds' administered at non-acupuncture (placebo) points.

Mean pain intensity on visual analogue scale (VAS) was similar in each group at baseline (57 to 58 mm). Each group received two courses of treatment with needles or seeds left in situ and were asked not to modify their analgesic medication during the course of the study. The duration of each course was determined by the time it took the needles to fall out or for the ear seeds to become unstuck and fall off. Pain scores were recorded at 1 month (termed D30 in the report) and 2 months (termed D60 in the report). Measures of electrodermal response at points on the ear were also taken at the same intervals. No adverse events were reported by either participants or their doctors. The main outcome measure was pain at 2 months, with secondary outcomes being pain at 1 month and electrodermal response at 1 and 2 months.

The reported results showed a significant decrease in pain intensity of 36% (58 mm to 37 mm on VAS) from baseline at 2 months in the acupuncture group with an insignificant change in the group having acupuncture at placebo points (58 mm to 55 mm on VAS). The differences between the acupuncture and placebo acupuncture groups was statistically significant ($P < 0.0001$). Pain scores at 1 month were also lower in the true acupuncture group than either of the other two groups.

Chen 2008 conducted a parallel group study comparing acupuncture to analgesic medication. This paper was written in Chinese and was translated by colleagues within our University Department to obtain a description of the methodology and results. Sixty six adult participants (age range of 41 to 70 years) with pain associated with "late" but unspecified cancer were categorised into groups according to pain severity - "mild", "moderate" and "severe". Participants received either acupuncture applied at 3 to 5 'tender' acupuncture points, or analgesic medication based on the World Health Organisation (WHO) 3-step principle and included aspirin for mild pain, codeine for moderate pain and morphine for severe pain. No placebo control group was included.

Pain intensity was measured by change in visual analogue score. Participants were categorised into groups according to the change in pain intensity relative to baseline as follows:

- Complete Relief = visual analogue score (VAS) changes of 91 to 100% reduction in pain intensity from baseline.
- Average relief = VAS changes of 61 to 90% reduction in pain intensity from baseline.
- Partial relief = VAS changes of 31 to 60% reduction in pain intensity from baseline.
- No relief = VAS changes of less than 31% reduction in pain intensity from baseline.

The percentage of participants in each category falling into each of the above category was calculated and recorded and a cut-off point of pain relief of 31% or more set as criteria for "general effectiveness". It was concluded that the analgesic effect of acupuncture was significantly more effective than medication with the total effectiveness of acupuncture reported as 94% in the acupuncture group and 87.5% in the medication group ($P < 0.05$).

It was not possible to extract data because no raw data or standard deviations were reported.

Dang 1998 randomly allocated 48 participants with pain from stomach carcinoma to receive one of three treatments:

- Acupuncture (filiform needle) $n = 16$;
- Acupuncture point injection with human transfer factor $n = 16$;
- Western medicine (analgesic medication based on the WHO analgesic ladder) $n = 16$.

In addition a group of 16 healthy normal participants were as used as a control. This group did not receive any treatment and it was assumed that the control group was included for comparison of biochemical data over the course of the study (e.g. leukocyte count). Acupuncture was administered at 4 to 5 'main points' and 2 to 4 'auxiliary points' according to traditional acupuncture points and based on the patient's signs and symptoms. Needles remained in situ for 20 minutes. Treatment was given continuously for 2 weeks followed by a gap of 2 to 3 days before continuing. The total treatment period was 2 months. Each acupuncture treatment course consisted of one treatment per day for grade I pain and 2 to 3 sessions per day for grade II or III pain (according to the WHO criteria). For the point injection group an injection of 0.5 ml of freeze-dried human transfer factor aqueous solution was administered into four acupuncture points selected in a similar manner to the acupuncture group. This was done twice per week. Participants in the Western medicine group received analgesics including aspirin, indomethacin, AP-237, codeine, dihydrocodeine and dolantin, based on the WHO 3-step ladder. Transient effects (30 minutes after treatment) and long-term effects (12 hours post-treatment) were calculated for the first 10 days of treatment and

the final 10 days of treatment over a 2 month period. At each stage of the study participants were categorised into groups according to the effectiveness of treatment: 'Markedly Effective', 'Improved' and 'Ineffective'. The percentage of participants in the 'Markedly Effective' and 'Improved' categories groups were used as a measure of effectiveness. No explanation was given as to how pain was measured and how participants were categorised into these groups even after referring to the earlier paper, [Dang 1997](#), for further details.

The results indicated that medication provided more effective analgesia during the first 10 days of treatment when considering both transient and long-term effects. During the final 10 days of treatment the transient effects of the acupuncture and point injection group were similar to the medication group and the long-term effects were equal ($P > 0.05$). However, taking only the long-term 'markedly effective' scores for the acupuncture (48.8%) and point injection (51.9%) groups during the final 10 days of treatment, these were significantly higher than in the medication group (33.8%) (both $P < 0.05$).

A summary of the three included studies can be found in [Table 2](#).

Excluded studies

Most of the papers identified through our searches as being on acupuncture for cancer pain did not contain clinical data. After the initial screening by title and abstract, 17 studies remained and 13 of these were subsequently excluded. Two studies were excluded because they were not randomised ([Aung 1994](#); [Guo 1995](#)). Two of the three studies that were not written in English were initially included ([Meng 2002](#); [Nguyen 2005](#)) because a translation was not available at the initial screening. Translated abstracts were obtained at a later date which enabled us to exclude these studies as neither were clinical trials. [Xia 1986](#) was excluded after discussion because pain was not a primary outcome measure and some of the participants were suffering from post-operative pain which excluded the study from the review. [Poulain 1985](#) was also a study of postoperative pain and was excluded on this basis. The studies by [Carr 2002](#) and [Goudas 2001](#) were narrative reviews of the evidence and [Yu 1992](#) was a discussion paper. [Minton 2007](#) was a letter, although this wasn't clear in the initial screening by

title and abstract. The study by [Zhang 2006](#) fitted many of the inclusion criteria but was a study of herbal medicine for cancer pain with no acupuncture. A search conducted just prior to publication identified two further studies that were potentially eligible ([Akhileswaran 2010](#); [Sima 2009](#)). Both of these studies were only available as conference abstracts with no traceable published papers and therefore did not meet our inclusion criteria. Contact details for the authors were not provided in either of the abstracts. Nevertheless, the work conducted by [Sima 2009](#) is worthy of mention because it provides some clinical data from an RCT investigating the effects of electroacupuncture on neuropathic pain and other measures in patients with metastatic breast and lung cancer. The study found that acupuncture alleviated neuropathic bone pain and decreased consumption of analgesics as compared with a control group receiving acupuncture on non-acupuncture points. However, insufficient information was available within the abstract on the control group intervention.

Risk of bias in included studies

A modified version of the five-point Oxford Quality Scale ([Jadad 1996](#); [White 1999](#)) was used to assess methodological quality ([Table 1](#)). One study scored four out of five points and met the criteria for a high quality study ([Alimi 2003](#)). This study lost one point for subject blinding because although the acupuncture and placebo acupuncture groups were blinded, participants receiving ear seeds were not blinded as the seeds had to be fixed with adhesive tape. The two remaining studies ([Chen 2008](#); [Dang 1998](#)) both received two points out of five. They both lost one point for not reporting participant blinding, one point for not reporting assessor/evaluator blinding and one point for not reporting participant withdrawals/dropouts. These studies were therefore deemed to be of low methodological quality. Risk of bias was also assessed and this information is summarised in the [Risk of bias in included studies](#) and [Figure 2](#). It is clear from this information that although [Alimi 2003](#) received the highest score for methodological quality according to the five-point scale, additional risk of bias was introduced by the wide variation in the number of days the needles or ear seeds remained affixed to the ear and also in the fact that some of the participants changed their analgesic medication, which was contrary to the study protocol.

Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding (performance bias and detection bias)	Incomplete outcome data (attrition bias)	Other bias
Alimi 2003	+	+	-	+	-
Chen 2008	+	?	-	-	-
Dang 1998	+	-	-	-	-

Effects of interventions

[Alimi 2003](#), found a significant decrease in pain intensity recorded on VAS at 1 month and 2 months. Participants in the true acupuncture group had significantly lower pain scores at 2 months than either the placebo acupuncture or ear seeds group ($P < 0.001$) with an overall 36% decrease in pain intensity as measured on a VAS. There was little change in pain intensity recorded for the placebo acupuncture group (2%).

[Chen 2008](#), reported that acupuncture was more effective (94.1%) as compared with medication (87.5%) ($P < 0.05$). The percentage of participants showing an improvement in VAS scores of 31% or more was used as a measure of 'general effectiveness' and the difference was tested again using chi squared. These results should

be treated with caution as the description and reporting of the study is unclear and the method of analysis debatable.

[Dang 1998](#) reported that the western medication group experienced more effective immediate analgesia during the first 10 days than the filiform needle or point injection groups, but by the final 10 days the effects were similar. There were no significant differences between the groups in either transient or long-term effects. The use of ordinal categories for pain relief without specifying parameters make additional comparisons of trial data meaningless. Also, the pain outcomes in this study were linked to improving sleep and other quality of life criteria which presents a confusing picture.

DISCUSSION

Summary of main results

This review illustrates how few studies of acupuncture for cancer pain exist. We found no additional high-quality evidence since the last systematic review of acupuncture for cancer pain by Lee 2005. There remains only one high-quality study (Alimi 2003) which shows positive results for auricular (ear) acupuncture over placebo. A low-quality study on participants with stomach carcinoma (Dang 1998) failed to show a significant difference between conventional analgesia and acupuncture within the first 10 days of treatment, but indicated an increased long-term analgesic effect over western medicine during the final 10 days. Inadequacy of outcome measures, absence of reliable statistical methodology and failure to report blinding undermines this evidence. A low quality study reported significant benefits of acupuncture over conventional medication (Chen 2008) although the method of analysis was poor and raw data was not available. The study was poorly reported with no mention of blinding. The heterogeneity of methodologies, cancer populations and techniques used in the included studies precluded pooling of data and therefore meta-analysis was not carried out. A subgroup analysis on acupuncture for CIBP was not conducted because none of the studies made any reference to bone pain.

When adequacy of acupuncture dose was examined the high-quality auricular study (Alimi 2003) reported the use of an average of six auricular points and an average treatment duration was 44 minutes. This partially meets the criteria for adequacy as suggested by White 2007, but it was unclear how many treatments were carried out and needle sensation was not reported. One low quality study used less than six needles and did not report the frequency of treatment sessions (Chen 2008). The other low quality study reported adequate duration, frequency and points used but the frequency of treatment varied depending on the level of pain reported (Dang 1998). Reference was made to achieving 'de qi' (needle sensation) in just one of the studies (Dang 1998) which mentioned the need to concentrate the mind on the diseased site to promote needle sensation.

AUTHORS' CONCLUSIONS

Implications for practice

The evidence from one high-quality RCT is insufficient to provide a judgement on whether acupuncture is effective in treating cancer-

related pain in adults, although acupuncture is used quite widely for this purpose and for other cancer-related conditions. As peer-reviewed guidelines exist for the use of acupuncture in cancer patients (Filshie 2006) it is suggested that practitioners follow these guidelines and that patients are made aware of the potential limitations of this type of intervention.

Implications for research

Acupuncture is widely used to treat cancer-related pain, but the available evidence is inconclusive or of low quality. Therefore a judgement on whether acupuncture is effective cannot be made and more large RCTs are required with particular attention given to:

- power calculations to ensure adequate sample sizes;
- homogeneity of cancer pain conditions under study;
- use of optimal dose of acupuncture;
- assessor blinding;
- use of valid and reliable pain outcome measures;
- the nature of the control used.

Trials of acupuncture comparing with sham and placebo interventions which control for patients' expectations and beliefs about the effects of treatment have been used to determine whether acupuncture has specific effects over and above a placebo response (Ernst 2004; Ernst 2006; Johnson 2006). However, findings have been inconsistent and there is an ongoing debate as to whether sham and placebo acupuncture is appropriate as a control because it may not be physiologically inert and as powerful as verum (acupuncture) (Lund 2009; Lundeberg 2008). Therefore pragmatic trials of the effectiveness of acupuncture on cancer pain compared with standard treatment may provide useful information (Lundeberg 2009) but attention should be given to ensuring an adequate dose of acupuncture is given in line with current recommendations (White 2008).

As no studies investigating acupuncture for CIBP were identified, this is an area which should be specifically targeted for further research.

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The review authors are affiliated to the Leeds Pallium Research Group (www.leeds.ac.uk/pallium/index.htm).

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Alimi 2003

Methods	RCT, 3 arms
Participants	90 adult participants with cancer pain ≥ 30 mm on VAS for at least 1 month. Excluded if had acupuncture before. Age range 37-84. All patients were on stable analgesia
Interventions	2 treatments of auricular acupuncture at points selected according to electrodermal response (n=29) Auricular acupuncture at placebo points (n=30) Auricular seeds at placebo points (n=31)
Outcomes	Pain on VAS Pain after 1 month and 2 months Average electrical potential differences at 1 and 2 months
Notes	Analgesic medication recorded in self-report diary Modified Oxford quality score: 4

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Blinded computer-generated randomisation was used
Allocation concealment (selection bias)	Low risk	Allocation concealment was maintained for both acupuncture groups but not for the ear seeds group as these were easily identifiable by their adhesive strips
Blinding (performance bias and detection bias) All outcomes	High risk	Acupuncture and placebo acupuncture subjects blinded Ear seeds group not blinded The acupuncturist was not blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Withdrawals and missing data adequately described. These included 5 refusals of second course of treatment and 3 changes of analgesia before the second course of treatment
Other bias	High risk	Wide variation in number of days needles or ear seeds remained attached to the ear. Ranges from 2-25 days for acupuncture, 3-33 days for placebo acupuncture and 1-34 days for ear seeds Some patients altered their analgesic intake during the course of the study but their results were included in the final report

Chen 2008

Methods	RCT, 3 arms
Participants	66 participants with cancer pain randomised to 3 groups: mild pain, moderate pain and severe pain Each of 3 pain groups randomly divided into an acupuncture group and an oral medication group
Interventions	Acupuncture group and oral medication group according to WHO 3 step administration: Mild pain - aspirin Moderate pain - codeine Severe pain - morphine
Outcomes	Pain scores measured on a VAS, with response percentage calculated as [(score before-score after)/score before] x 100 Analgesic effect reported from percentage difference in pain score. Complete relief (CR) 91-100%, average relief (AR) 61-90%, partial relief (PR) 31-60%, or no relief (NR) less than 31%
Notes	Translated from Chinese Modified Oxford quality score: 2

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation tables used to allocate subjects to the acupuncture or medication groups. It was not clear whether randomisation was carried out by blinded personnel
Allocation concealment (selection bias)	Unclear risk	Allocation concealment was not clearly stated
Blinding (performance bias and detection bias) All outcomes	High risk	Participant and evaluator blinding not described
Incomplete outcome data (attrition bias) All outcomes	High risk	Incomplete data and withdrawals not described
Other bias	High risk	Poor reporting of intervention and methodology Inadequate statistical analysis

Dang 1998

Methods	RCT using a block design with 3 pain groups, 2 intervention arms and 2 control groups
Participants	48 gastric cancer participants divided into 3 groups: mild, moderate and severe pain. Males and females aged 37-75. 16 normal controls were also included

Interventions	Filiform needle group (n=16): 7 main points (4-5 each session + 2-4 adjuvant points), 20 mins. Grade I patients treated daily, grades 2 & 3 treated 2-3 times daily. Each course 2 weeks with 2-3 days in between courses over a 2 month period Point injection group (n=16): 4 main points x 2 per week over 2 months. Injected with transfer factor Western Medicine group (n=16): analgesia was administered according to the WHO guidelines Normal controls (n=16): no intervention	
Outcomes	Pain during the first 10 days and the final 10 days based on the Graded WHO criteria Changes in Leucine-enkephalin in plasma (PLEK) Changes in CuZn-superoxide (CuZn-SOD) dismutase activity in whole blood Patient-reported chemotherapy reactive symptoms (e.g. dizziness, vomiting)	
Notes	Modified Oxford quality score: 2	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomised block experimental design used but method of randomisation not described, nor whether this was carried out by blinded personnel
Allocation concealment (selection bias)	High risk	Allocation concealment was not stated
Blinding (performance bias and detection bias) All outcomes	High risk	No blinding described
Incomplete outcome data (attrition bias) All outcomes	High risk	Incomplete data and withdrawals not described
Other bias	High risk	Inappropriate control group of normal healthy participants Poor reporting of methodology and intervention

RCT = Randomised, controlled trial

VAS = Visual analogue score

WHO = World Health Organisation

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Akhileswaran 2010	Conference abstract with no traceable published paper
Aung 1994	Not a RCT of acupuncture for cancer pain
Carr 2002	Narrative review of evidence on acupuncture for cancer pain. No clinical data included
Goudas 2001	Narrative review of evidence on acupuncture for cancer pain. No clinical data included
Guo 1995	This contained clinical data on acupuncture for cancer pain but was not a RCT
Meng 2002	This is a discussion paper on the use of traditional Chinese medicine in oncology
Minton 2007	This is a letter within a journal and contained no clinical data
Nguyen 2005	This is a systematic review of acupuncture for cancer pain
Poulain 1985	This study investigated pre and post-operative analgesia in cancer patients compared with acupuncture analgesia
Sima 2009	Conference abstract only. No traceable published paper
Xia 1986	Pain was not a main outcome measure in this study
Yu 1992	This is a discussion paper on the use of traditional Chinese medicine to control cancer pain, and includes various traditional Chinese interventions. No clinical data is included
Zhang 2006	This was a study on the use of herbal treatments for cancer pain. No acupuncture was included

DATA AND ANALYSES

Comparison 1. Alimi 2003 - Auricular acupuncture vs placebo

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain on VAS at 2 months	1	57	Std. Mean Difference (IV, Random, 95% CI)	-0.82 [-1.36, -0.28]

Comparison 2. Alimi 2003 - Acupuncture vs placebo ear seeds

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain on VAS at 2 months	1	59	Std. Mean Difference (IV, Random, 95% CI)	-1.06 [-1.61, -0.51]

Comparison 3. Alimi 2003 - Placebo acupuncture vs placebo ear seeds

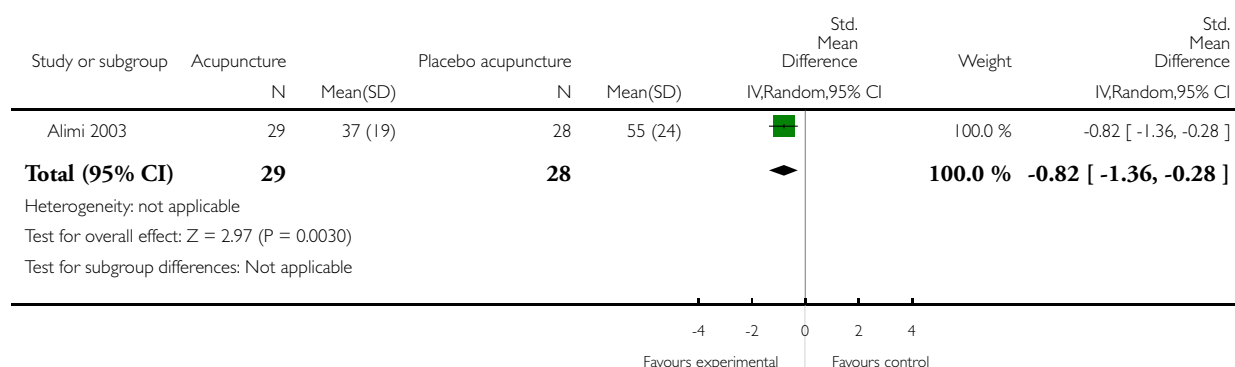
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain on VAS at 2 months	1	58	Std. Mean Difference (IV, Random, 95% CI)	-0.13 [-0.65, 0.38]

Analysis 1.1. Comparison 1 Alimi 2003 - Auricular acupuncture vs placebo, Outcome 1 Pain on VAS at 2 months.

Review: Acupuncture for cancer pain in adults

Comparison: 1 Alimi 2003 - Auricular acupuncture vs placebo

Outcome: 1 Pain on VAS at 2 months

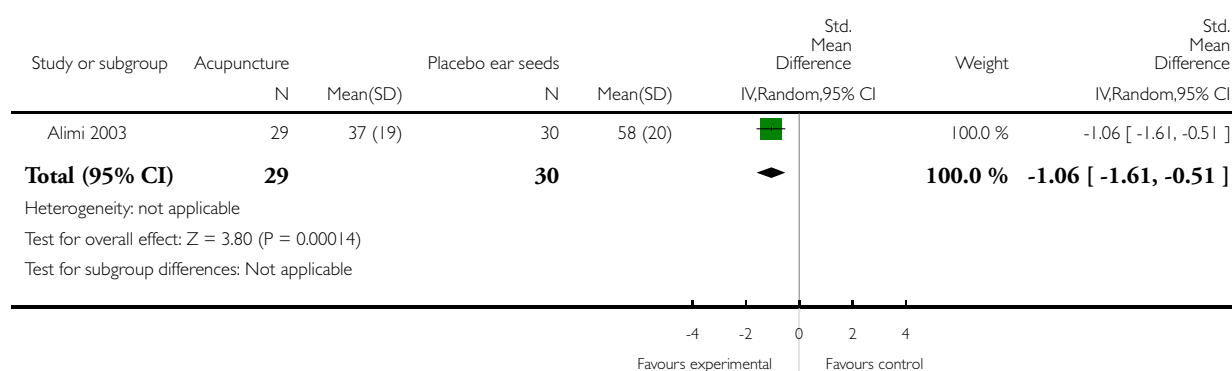


Analysis 2.1. Comparison 2 Alimi 2003 - Acupuncture vs placebo ear seeds, Outcome 1 Pain on VAS at 2 months.

Review: Acupuncture for cancer pain in adults

Comparison: 2 Alimi 2003 - Acupuncture vs placebo ear seeds

Outcome: 1 Pain on VAS at 2 months

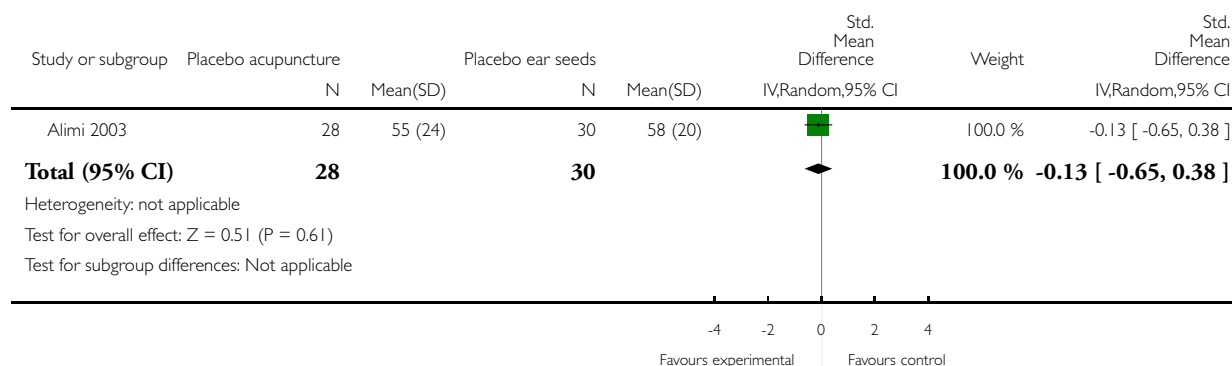


Analysis 3.1. Comparison 3 Alimi 2003 - Placebo acupuncture vs placebo ear seeds, Outcome 1 Pain on VAS at 2 months.

Review: Acupuncture for cancer pain in adults

Comparison: 3 Alimi 2003 - Placebo acupuncture vs placebo ear seeds

Outcome: 1 Pain on VAS at 2 months



ADDITIONAL TABLES

Table 1. Modified Oxford 5-Point Quality Scale for Assessment of Methodological Quality

Criteria	Alimi 2003	Chen 2008	Dang 1998
Study described as randomised (+1)	1	1	1
Appropriate randomisation method used (+1)	1	1	1
Inappropriate method of randomisation (-1)	-	-	-
Subject blinded (+1)	0	0	0
Evaluator blinded (+1)	1	0	0
Dropouts/withdrawals described	1	0	0
SCORE	4	2	2

Table 2. Acupuncture for cancer pain in adults: Summary of included studies

Author (year)	Design	Method quality score	Groups and interventions	Pain outcome measures	Secondary outcomes	Pain results
Alimi 2003	RCT, n=90 single-blind 3 groups	4	Auricular acupuncture (n=29) Auricular acupuncture at placebo points (n=30) Auricular seed at placebo points (n=31)	Pain intensity on VAS at D30 and D60	Average electrical potential difference at D30 and D60	Pain intensity on VAS significantly decreased in acupuncture group compared with placebo at both D30 and D60
Chen 2008	RCT n=66 3 groups, 2 sub-groups for each group	2	3 groups: mild, moderate and severe pain, each group randomly subdivided into 2 sub-groups: acupuncture group and medication group	Analgesic effect: Complete relief (CR) Average relief (AR) Partial Relief (PR) No relief (NR)	None reported	General effectiveness (%) in Acupuncture group: Mild pain=100%; Mod pain=94.4%; severe pain=91.7% In Medication group: Mild pain=75%; Mod pain=89.5%; Severe pain=88.9% Groups compared for general effectiveness: Acupuncture=94.1% Medication=87.5%
Dang 1998	RCT, n=48, 4 groups	2	3 pain groups randomly divided into: Fliform Needle, Point Injection and Western Medicine (medication) groups. 1 control group of normal subjects	Treatment effectiveness % score based on 3 categories: Markedly effective Improved Ineffective Categories include pain, vigour, sleep and appetite.	PLEK concentration Quality of life Chemotherapeutic reaction E-RFR (%) Leukocyte count	After 2 months total effective rates of analgesia were around 81% for FN, PI and WM groups and the markedly effective scores were FN 48.8%, PI 51.9% and WM 33.8%

APPENDICES

Appendix I. MEDLINE search strategy

1. exp Acupuncture Therapy/ (11796)
2. exp Medicine, East Asian Traditional/ (9312)
3. Acupuncture/ (860)
4. (acupuncture or acupressure or acupoint* or electroacupuncture or electro-acupuncture or meridian* or moxibust* or “traditional chinese medicine” or “traditional oriental medicine”).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (19418)
5. 4 or 1 or 3 or 2 (26132)
6. exp Neoplasms/ (2075388)
7. (neoplasm* or cancer* or carcino* or malignan* or tumor* or tumour*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (2221292)
8. or/6-7 (2483290)
9. exp Pain/ (246185)
10. pain*.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (376859)
11. Analgesia/ (11230)
12. (analges* or nocicept* or neuropath*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (189913)
13. or/9-12 (559785)
14. 13 and 8 and 5 (275)
15. randomized controlled trial.pt. (280165)
16. controlled clinical trial.pt. (80498)
17. randomized.ab. (189021)
18. placebo.ab. (115356)
19. drug therapy.fs. (1346163)
20. randomly.ab. (136940)
21. trial.ab. (195831)
22. groups.ab. (935356)
23. or/15-22 (2465926)
24. exp animals/ not humans.sh. (3448923)
25. 23 not 24 (2089714)
26. 25 and 14 (88)
27. 2009****.ed. (506278)
28. 26 and 27 (7)
29. from 28 keep 1-7 (7)

Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity-maximizing version (2008 revision); OVID format

1. randomized controlled trial.pt.
2. controlled clinical trial.pt.
3. randomized.ab.
4. placebo.ab.
5. drug therapy.fs.
6. randomly.ab.
7. trial.ab.
8. groups.ab.
9. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
10. Animals.sh. not (humans.sh. and animals.sh.)
11. 9 not 10

Total number of records found: 63

Appendix 2. CENTRAL search strategy

1. Cancer near pain
2. Bone Pain
3. Metasta\$
4. #1 or #2 or #3
5. Acupuncture
6. Complementary therapy [ti,ab,kw]
7. #5 and #6
8. #4 and #7

Total number of records found: 51

Appendix 3. AMED (Allied and Complementary Medicine) search strategy

1. (acupuncture or acupressure or acupoint* or electroacupuncture or electro-acupuncture or meridian* or moxibust* or "traditional chinese medicine" or "traditional oriental medicine").mp. [mp=abstract, heading words, title] (8895)
 2. (neoplasm* or cancer* or carcino* or malignan* or tumor* or tumour*).mp. [mp=abstract, heading words, title] (12845)
 3. pain*.mp. [mp=abstract, heading words, title] (21140)
 4. (analges* or nocicept* or neuropath*).mp. [mp=abstract, heading words, title] (4063)
 5. 4 or 3 (22808)
 6. 1 and 2 and 5 (71)
 7. exp randomized controlled trials/ (1350)
 8. exp double blind method/ (388)
 9. exp random allocation/ (288)
 10. (random\$ or control\$ or placebo\$ or factorial).mp. [mp=abstract, heading words, title] (27645)
 11. (double adj blind).mp. [mp=abstract, heading words, title] (1296)
 12. (single adj blind).mp. [mp=abstract, heading words, title] (305)
 13. exp comparative study/ (4134)
 14. or/7-13 (30652)
 15. 6 and 14 (27)
 16. from 15 keep 1-27 (27)
- Total number of records found: 27

Appendix 4. EMBASE search strategy

1. acupuncture/ or acupuncture analgesia/ or electroacupuncture/ or acupressure/ (13166)
2. exp ACUPUNCTURE THERAPY/ (13179)
3. chinese medicine/ or oriental medicine/ (8536)
4. (acupuncture or acupressure or acupoint* or electroacupuncture or electro-acupuncture or meridian* or moxibust* or "traditional chinese medicine" or "traditional oriental medicine").mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] (18853)
5. 2 or 4 or 1 or 3 (23706)
6. exp Neoplasms/ (1481026)
7. (neoplasm* or cancer* or carcino* or malignan* or tumor* or tumour*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] (1605212)
8. or/6-7 (1845304)
9. exp Pain/ (375235)
10. pain*.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] (371531)
11. Analgesia/ (43678)
12. (analges* or nocicept* or neuropath*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] (221904)

13. or/9-12 (617984)
14. 8 and 13 and 5 (615)
15. random*.ti,ab. (397881)
16. factorial*.ti,ab. (8307)
17. (crossover* or cross over* or cross-over*).ti,ab. (39692)
18. placebo*.ti,ab. (110792)
19. (doubl* adj blind*).ti,ab. (85277)
20. (singl* adj blind*).ti,ab. (7523)
21. assign*.ti,ab. (109581)
22. allocat*.ti,ab. (34657)
23. volunteer*.ti,ab. (99728)
24. CROSSOVER PROCEDURE.sh. (21298)
25. DOUBLE-BLIND PROCEDURE.sh. (72449)
26. RANDOMIZED CONTROLLED TRIAL.sh. (168923)
27. SINGLE BLIND PROCEDURE.sh. (8167)
28. or/15-27 (665787)
29. ANIMAL/ or NONHUMAN/ or ANIMAL EXPERIMENT/ (3460363)
30. HUMAN/ (6490253)
31. 29 and 30 (541210)
32. 29 not 31 (2919153)
33. 28 not 32 (579835)
34. 33 and 14 (107)
35. from 34 keep 1-107 (107)

Total number of records found: 77

Appendix 5. PsycINFO search strategy

1. (acupuncture or acupressure or acupoint* or electroacupuncture or electro-acupuncture or meridian* or moxibust* or “traditional chinese medicine” or “traditional oriental medicine”).mp. [mp=title, abstract, heading word, table of contents, key concepts] (1679)
2. (neoplasm* or cancer* or carcino* or malignan* or tumor* or tumour*).mp. [mp=title, abstract, heading word, table of contents, key concepts] (28978)
3. pain*.mp. [mp=title, abstract, heading word, table of contents, key concepts] (50211)
4. (analges* or nocicept* or neuropath*).mp. [mp=title, abstract, heading word, table of contents, key concepts] (22783)
5. 4 or 3 (63662)
6. 1 and 2 and 5 (21)
7. randomized.ab. (18521)
8. placebo.ab. (21105)
9. randomly.ab. (33558)
10. trial.ab. (36218)
11. groups.ab. (234910)
12. or/7-11 (304624)
13. 6 and 12 (8)
14. from 13 keep 1-8 (8)

Total number of records found: 3

Appendix 6. SPORTDiscus (via EBSCO) search strategy

1. S1 and S2 and S3 (9)
2. pain* or analges* or nocicept* or neuropath* (30909)
3. neoplasm* or cancer* or carcino* or malignan* or tumor* or tumour* (13267)
4. acupuncture or acupressure or acupoint* or electroacupuncture or electro-acupuncture or meridian* or moxibust* (1062)

Total number of records found: 9

WHAT'S NEW

Last assessed as up-to-date: 23 November 2010.

Date	Event	Description
25 April 2012	Amended	A correction was made by moving the 'Summary of included studies' from the 'Summary of findings' table section to the 'Additional tables' section in the review

HISTORY

Protocol first published: Issue 2, 2009

Review first published: Issue 1, 2011

CONTRIBUTIONS OF AUTHORS

Writing protocol: CP, AM-B, MJ, OT.

Writing full review: CP, OT, MJ.

Search databases: CP, OT.

Study selection: CP, OT, MJ.

Assessment of methodological quality: CP, OT, MJ.

Data extraction: CP, OT, MJ.

Statistical analysis: CP, OT.

Review update: CP, OT, MJ

DECLARATIONS OF INTEREST

None known

SOURCES OF SUPPORT

Internal sources

- Leeds Metropolitan University, UK.
Academic support for the project.

External sources

- No sources of support supplied

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We had planned to do a subgroup analysis on cancer-induced bone pain but this was not possible because this condition was not specifically mentioned in any of the papers reviewed. Heterogeneity prevented pooling of data and meta-analysis and it was only possible to do a forest plot for one study ([Alimi 2003](#)) because of the use of poorly defined categorical data in the remaining two studies.

INDEX TERMS

Medical Subject Headings (MeSH)

*Pain Management; Acupuncture Therapy [*methods]; Acupuncture, Ear [methods]; Neoplasms [*complications]; Pain [etiology]; Pain Measurement; Randomized Controlled Trials as Topic

MeSH check words

Adult; Humans